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First record of a new parasitoid wasp for France: *Calymmochilus russoi* Gibson, 1995 (Hymenoptera, Chalcidoidea, Eupelmidae)

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Hymenoptera; Chalcidoidea; Eupelmidae; *Calymmochilus*; *russoi*; Hérault; France; first record.

Abstract. – *Calymmochilus russoi* Gibson, 1995, a wasp from the family Eupelmidae, was observed for the first time in France on September 4th 2021. This is the third observation of this species ever. This sighting allowed for the first photographs of a live individual of this species. Furthermore, another specimen was once again observed in the exact same location one year later on September 1st 2022.

Galli M., 2023. – First record of a new parasitoid wasp for France: *Calymmochilus russoi* Gibson, 1995 (Hymenoptera, Chalcidoidea, Eupelmidae). *Faunitaxys*, 11(13): 1 – 5.

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Introduction

Parasitoid wasps from the superfamily Chalcidoidea make for an incredibly diverse group due to the variety of their morphology and colors as well as by their ecology. Indeed, these fascinating creatures fill tiny ecological niches and parasite a variety of terrestrial arthropod orders (Lepidoptera, Hemiptera, Hymenoptera, Coleoptera, Diptera, Neuroptera, Orthoptera, Odonata, Mantodea, Thysanoptera, Psocoptera, Siphonaptera, Araneae, Ixodida, Endeostigmata and more) and some even became secondarily phytophagous. As many as half a million species may exist, but only about 22,000 are documented, owing to their average size of 1.5 mm which makes them difficult to detect (Noyes, 2019).

Belonging to the superfamily Chalcidoidea, are the Eupelmidae, a family which currently includes 47 genera and 1103 species. They are mostly parasitic and facultatively hyperparasitic on the immature stages of other insects or even pseudoscorpions (Austin et al., 1998). The genus *Calymmochilus* includes 12 described species (six species in Europe, four of which can be found in France, including *C. russoi*; five species in Australia; one species in India) (Noyes, 2019).

In 1937, in Pisciotta, Province of Salerno, Campania, Italy, Giuseppe Russo reared three females of *C. russoi* from olive branches infested with *Phloeotribus scarabaeoides* (Bernard, 1788) (Coleoptera, Scolytidae). They emerged at the end of August and were described and illustrated but labeled as “Eupelmino (gen. n.?)” only to be named later by Gibson in 1995 (Russo, 1938; Fusu et al., 2018).

On October 17th 2012, Antoni Ribes collected galls of *Parapodia sinaica* (Frauenfeld, 1859) (Lepidoptera, Gelechiidae) on branches of *Tamarix canariensis* Willd. (Tamaricaceae) at Pantà de Camelis near his home village of Torres de Segre, Lerida (Lleida), Spain. Amongst some other parasitoids, he reared an Eupelmidae from the galls that he labeled as belonging to the *Arachnophaga* genus. It was later identified as *Calymmochilus russoi*, independently by R. R. Askew and by L. Fusu. It is unknown whether *C. russoi* was a primary or secondary parasitoid of either *P. sinaica* or of some other inhabitant of the galls. This was the second record (fourth specimen, second available specimen) of *C. russoi* and a first record for Spain as well as a new host record. To this day the male of this species remains unknown (Fusu et al., 2018).

Here, we report an opportunistic sight of *Calymmochilus russoi* in Southern France, based on a new entomological approach using macrophotography of live specimens rather than lethal collection. This approach works well on genera with not very numerous and distinct species of comparatively large size. Minute inspection under a stereomicroscope is still required to differentiate closely related species such as *Calymmochilus subnubilus* and *C. atratus*.

Materials and methods

Photographs of *Calymmochilus russoi* (Fig. 4 - 6) were obtained with a Canon EOS M50 camera, a Laowa 100mm f/2.8 2x Ultra Macro APO lens, a Godox TT685C flash and a GLS diffuser. RAW images were developed and exported to JPG using Adobe Lightroom Classic.

First observation in France

On September 4th 2021, I found an Eupelmidae (~ 2.5 mm) that was unfamiliar to me near La Buèges river, Causse-de-la-Selle, Hérault, France (43.8303, 3.6311) (Fig. 1) on a dead Alep Pine trunk (*Pinus halepensis* Mill.) with many holes (Figs. 2 & 3). It was walking in the interstices of the bark. I captured it only for a few hours in order to photograph it at night when it was calmer (Fig. 4) and then released it near its capture location. A few months later, I uploaded the photos on

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iNaturalist, an online community to share wildlife observations that can be used for research, where Jeong Yoo (Royal Ontario Museum, Toronto, Canada) and Adriano Bonomi-Cazzuoli (Mirandola, Italy) both suggested "*Calymmochilus russoi*" as the species (Galli, 2021). Using the key provided by Fusu et al. (2018), I was also able to identify that this was a female *Calymmochilus russoi* as the following features are clearly visible in the photographs (Fig. 5) : Mesosoma mostly orange-yellow and head metallic green to coppery; head flattened, with lower parascrobal region abruptly angled to gena, with a carina between torulus and lower orbit; scrobal depression abruptly sunken but shallow, with almost vertical, carinate sides. As Fusu et al. (2018) doesn't mention any records of the species in France, I contacted Richard Robinson Askew, one of the co-authors, who confirmed the identification and the first mention for France: "It is very difficult to identify Chalcidoidea with certainty from photographs, but the insect photographed looks very much like *Calymmochilus russoi* and I would be very surprised if it is not that species […]. Your photographs agree very well with the photographs in Fusu et al. (2018). There are, to the best of my knowledge, no records of *C. russoi* additional to those in that paper and the species has not previously been reported from France. Congratulations!". This observation can thus be considered as the first for France and the third ever in the world. The photos taken are the only pictures of a live *Calymmochilus russoi* adult female. Out of curiosity, I returned to the same area one year later, on September 1st 2022, and was able to observe another female of *C. russoi* on the exact same pine trunk as the previous year. I quickly took some in situ pictures (Fig. 6) to have proof of this fourth ever observation and second mention for France before it flew away.

Discussion

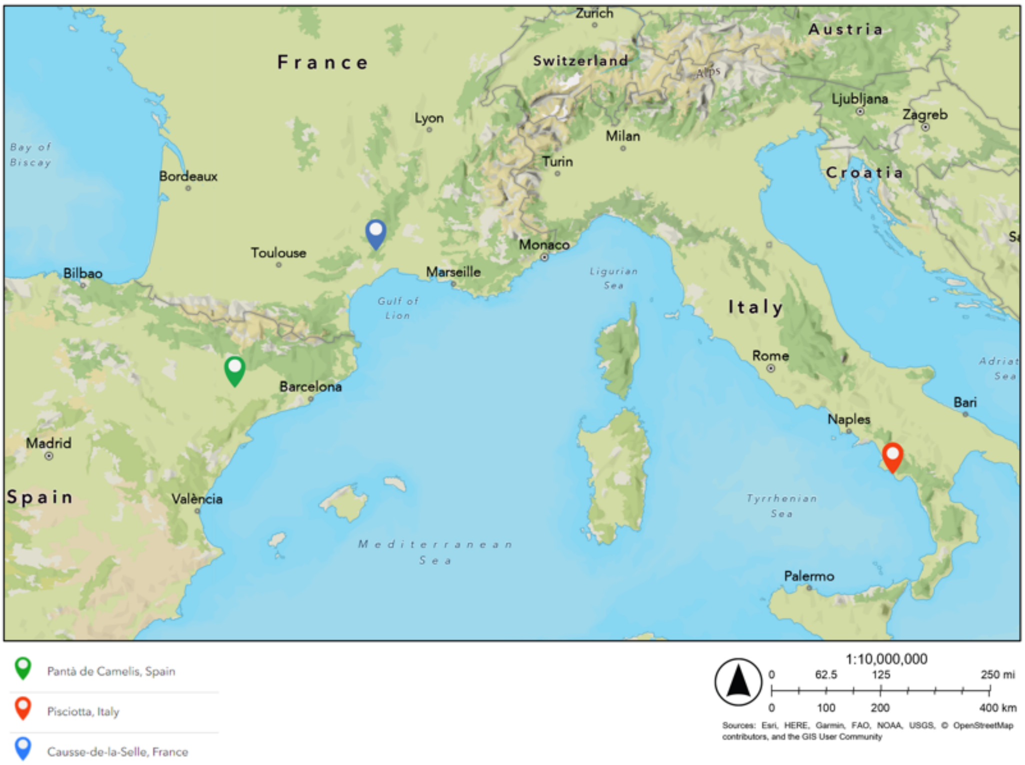
As opposed to how *C. russoi* was observed in 1937 and 2012, the females seen in 2021 and 2022 were not reared from any gall or branch but directly observed out in the field. This has the inconvenience of not providing information on its host in this locality. However, as both females were observed on the same Alep Pine, it can be speculated that its host is somehow related to that tree. This would fit with what little knowledge we have on the ecology of *C. russoi* as *Tamarix canariensis*, *Olea europaea* and *Pinus halepensis* are common species of the Mediterranean forests, woodlands, and scrubs biome. It can be noted that *Crematogaster scutellaris* (Olivier, 1792) (Hymenoptera, Formicidae) and *Pheidole pallidula* (Nylander, 1849) (Hymenoptera, Formicidae) were present on the same Pine tree both years but no interaction was observed with *C. russoi*. Collection of galls and further field scouting could be carried out in 2023 in an attempt to learn more about its host in this locality.

Whether the females observed were truly *Calymmochylus russoi* is out of question. Even though the females were not collected, the photographs allow to view the critical details well enough to ensure the identification of *Calymmochilus russoi* (Fig. 5). Photographs from digital cameras now provide enough quality to allow such discoveries, all the more with the help of the iNaturalist community (Kasalo et al., 2021).

The type of presence of *Calymmochilus russoi* is also to be considered. Since it is present in Italy and Spain and is only previously known from two localities, it is likely that it had simply been overlooked in France and it is not an accidentally introduced species.

Acknowledgements

Thank you to Jeong Yoo and Adriano Cazzuoli for helping me identify this specimen. Thank you to Richard Robinson Askew for sharing his knowledge on this species. I also wish to thank Laurent Pelozuelo (LEFE - Laboratoire Ecologie Fonctionnelle et Environnement), Toulouse, France) and Maxime Cauchoix (LEFE, Toulouse, France) for their guidance on writing my first article and Terri Galli (Marseille, France) for proofreading.



Sources: Esri, HERE, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

Figure 1. Map of the observations of *Calymmochilus russoi* Gibson, 1995.

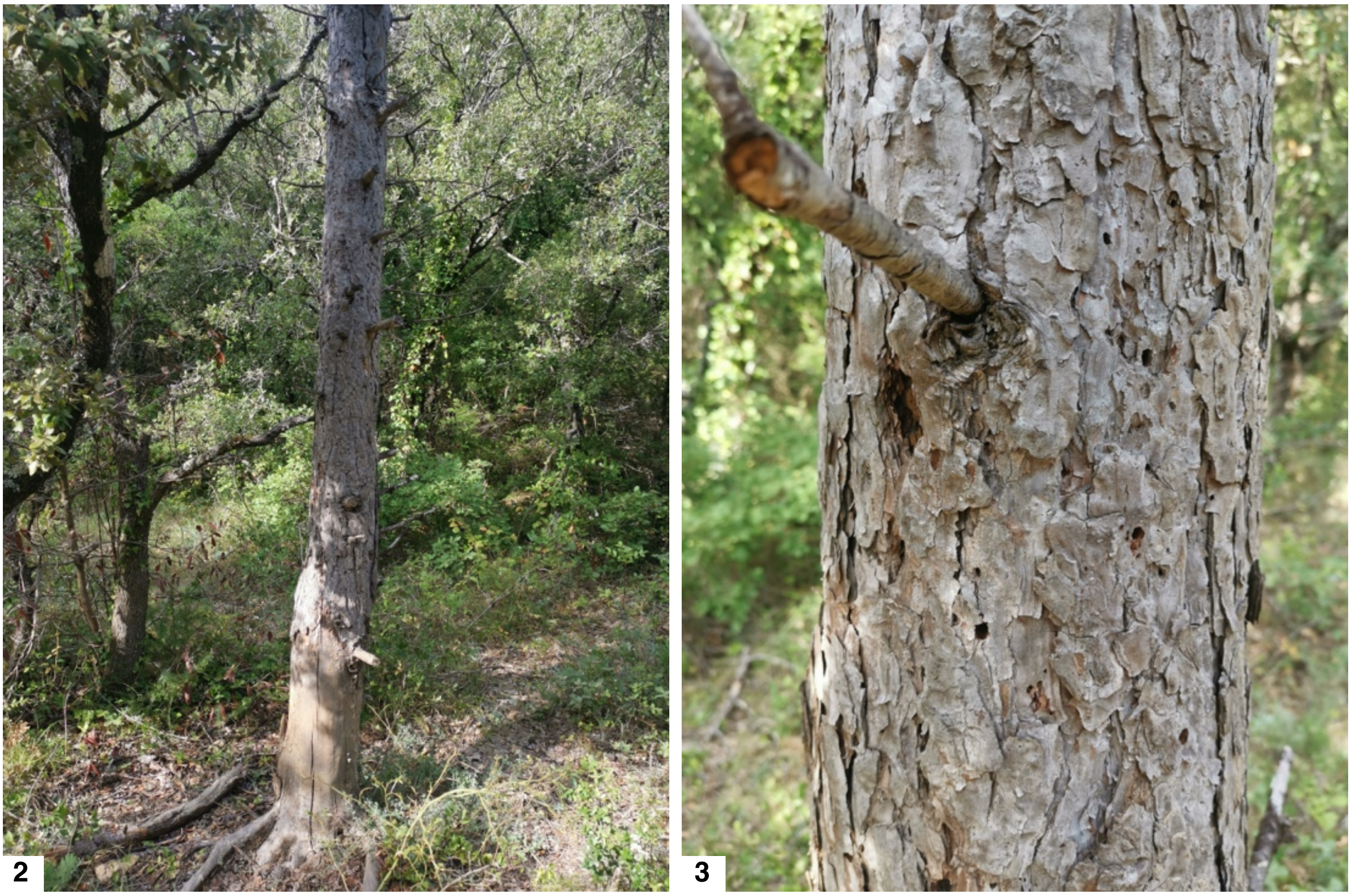


Figure 2-3. Dead Alep Pine (Pinus halepensis, Mill.) on which *C. russoi* Gibson, 1995 was found.

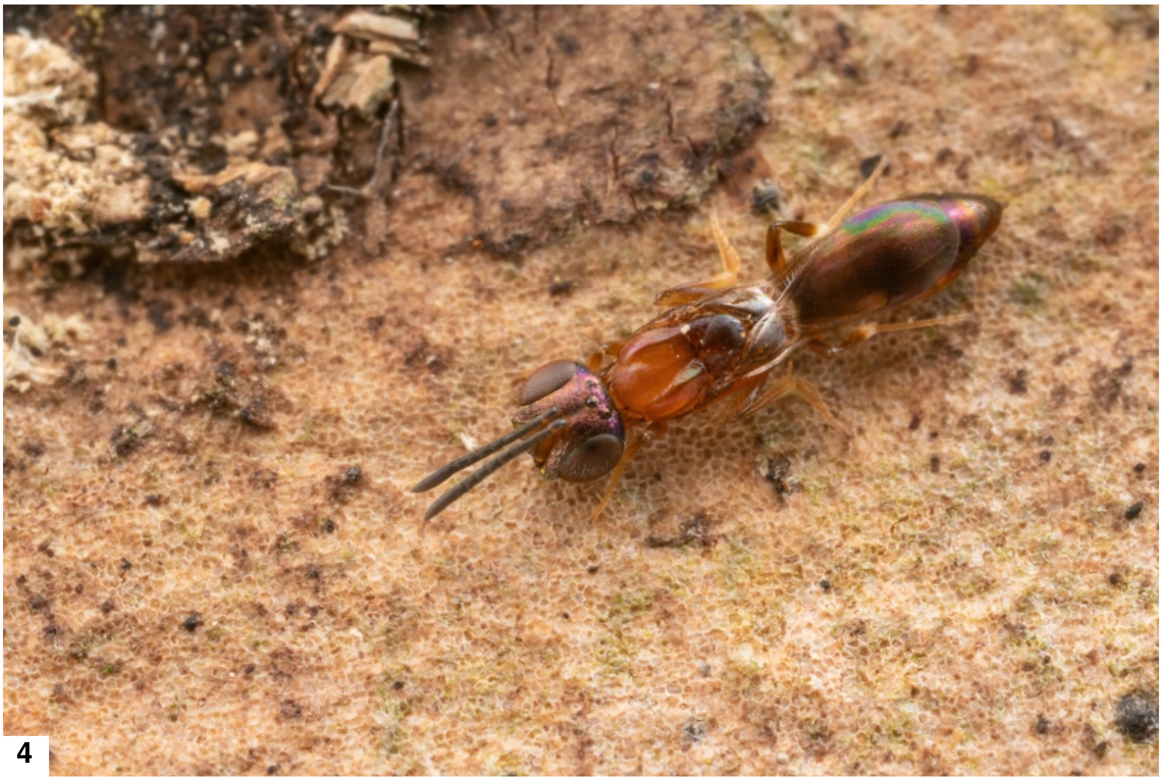


Figure 4. *Calymmochilus russoi* Gibson, 1995 observed on September 4th 2021.

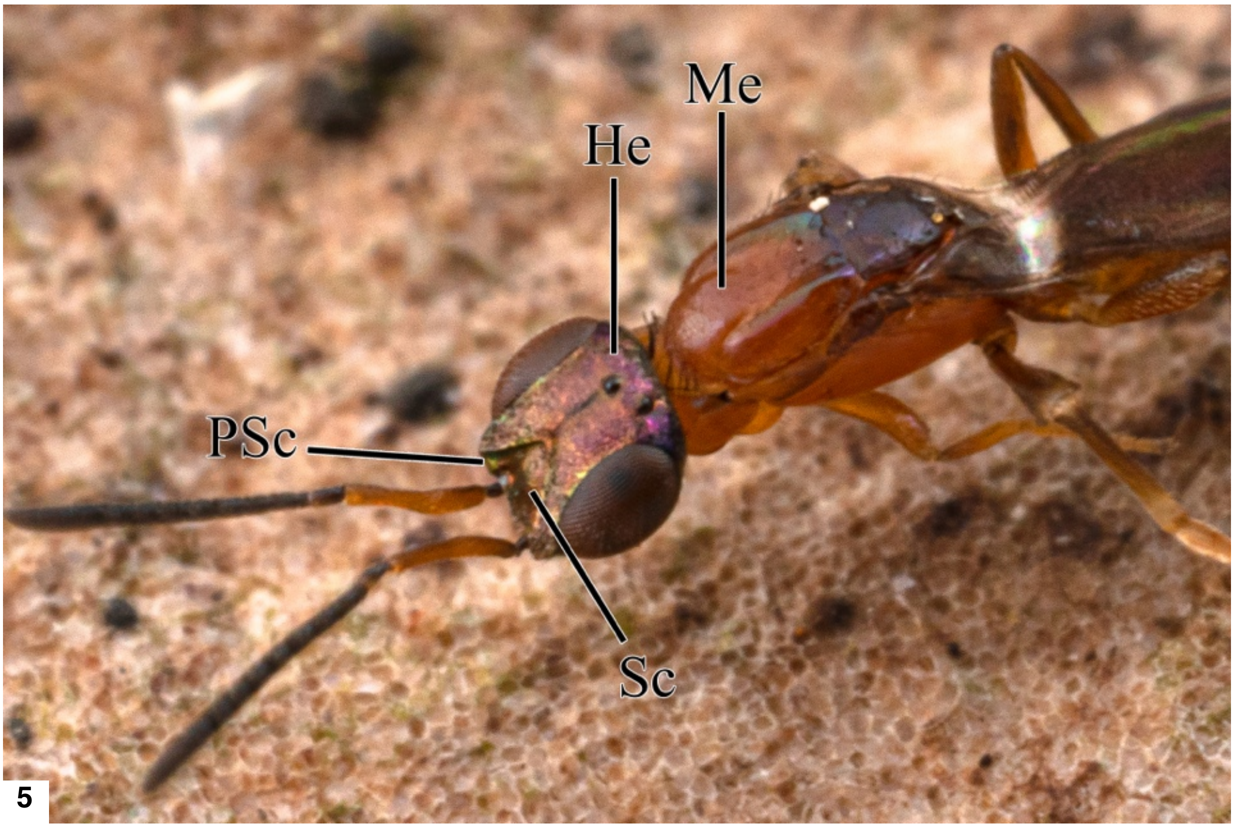


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Figure 5. Close-up of *Calymmochilus russoi* showing specific characteristics of head and mesosoma.

Me. Mesosoma mostly orange-yellow. **He**. Head flattened, metallic green to coppery. **PSc**. Lower parascrobal with a carina between torulus and lower orbit. **Sc**. Scrobal depression abruptly sunken but shallow.

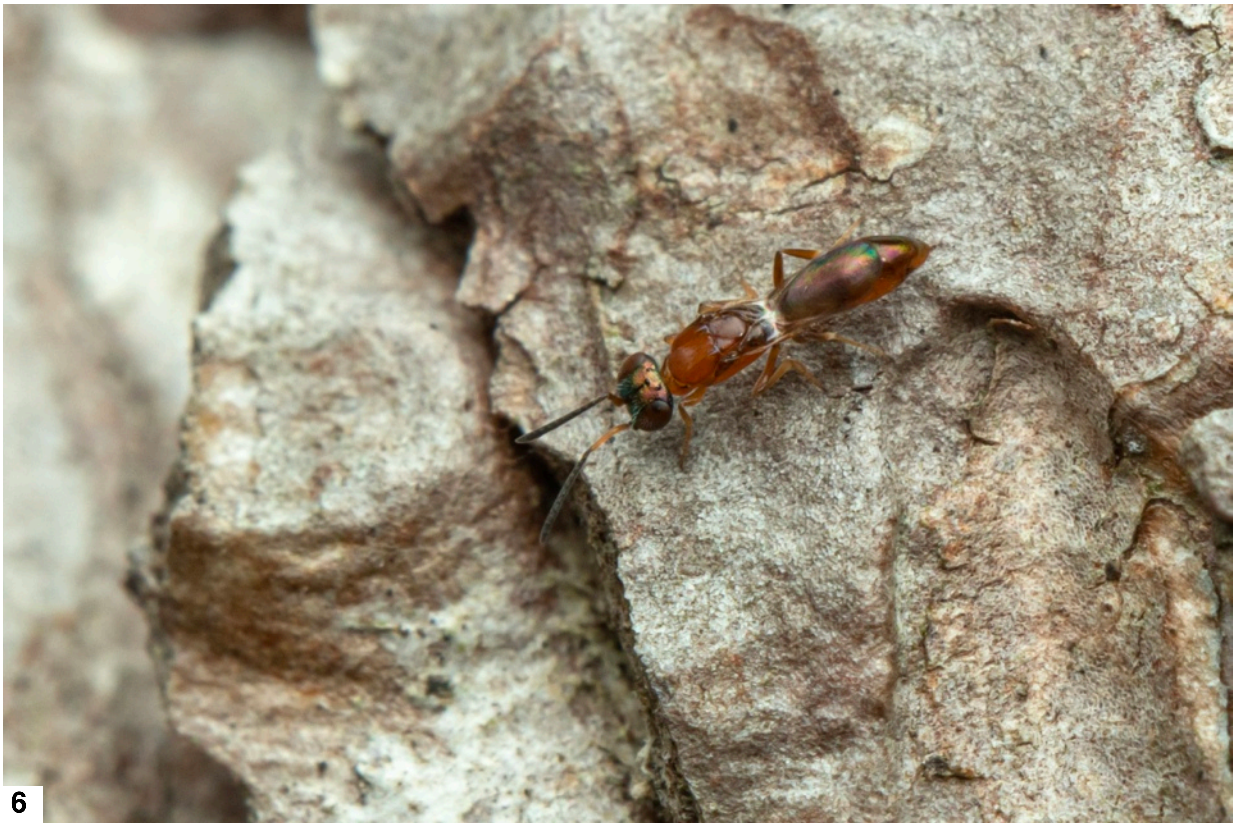

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Figure 6. *Calymmochilus russoi* Gibson, 1995 observed on September 1st 2022.

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Résumé

Galli M., 2023. – Première mention d'une nouvelle guêpe parasitoïde pour la France : *Calymmochilus russoi* Gibson, 1995 (Hymenoptera, Chalcidoidea, Eupelmidae). *Faunitaxys*, 11(13): 1 – 5.

Calymmochilus russoi Gibson, 1995, une guêpe de la famille Eupelmidae, a été observé pour la première fois en France le 4 Septembre 2021. Ceci est la troisième observation au monde de cette espèce et a permis les premières photographies d'un individu vivant de cette espèce. De plus, un autre spécimen a été vu exactement au même endroit un an plus tard, le 1er Septembre 2022.

Mots-clés. – Hymenoptera ; Chalcidoidea ; Eupelmidae ; *Calymmochilus* ; *russoi* ; Hérault ; France ; première donnée.

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Illustration de la couverture :
Calymmochilus russoi Gibson, 1995.

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